

1. An envelope elimination and restoration linear amplifier comprising an envelope control loop including a feedback path, wherein the gain of said feedback path is variable for controlling the gain of the amplifier.
- 5 2. An amplifier according to claim 1, wherein said feedback path includes downconverter means for downconverting the frequency of the feedback signal therein.
3. An amplifier according to claim 2, wherein said feedback path includes
10 gain control means before the downconverter means.
4. An amplifier according to claim 1, including a phase control loop.
5. An amplifier according to claim 4, wherein said feedback path includes
15 downconverter means for downconverting the frequency of the feedback signal therein.
6. An amplifier according to claim 5, wherein said feedback path includes gain control means before the downconverter means.
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7. An amplifier according to claim 1, wherein said feedback path is shared by the envelope control and phase control loops.
8. An amplifier according to claim 7, wherein said feedback path includes
25 downconverter means for downconverting the frequency of the feedback signal therein.
9. An amplifier according to claim 8, wherein said feedback path includes gain control means before the downconverter means.
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10. An amplifier according to claim 1, wherein the gain of the feedback path is electronically controllable.

11. An amplifier according to claim 10, wherein the feedback path comprises variable gain means responsive to a control signal to set its gain.
12. A communications device including an RF power amplifier according to
5 claim 10.
13. A communications device including an RF power amplifier according to claim 11.
- 10 14. A communications device according to claim 12, including control means for determining a desired output power and providing a corresponding control signal to the amplifier.
- 15 15. A communications device according to claim 13, including control means for determining a desired output power and providing a corresponding control signal to the amplifier.
16. A communications devices according to claim 12, including predistortion means for predistorting an input signal to compensate for signal distortion in the
20 amplifier, the output of the predistortion means forming the input for the amplifier, wherein the predistortion applied by the predistortion means is independent of the gain of the amplifier.
17. A communications devices according to claim 13, including predistortion
25 means for predistorting an input signal to compensate for signal distortion in the amplifier, the output of the predistortion means forming the input for the amplifier, wherein the predistortion applied by the predistortion means is independent of the gain of the amplifier.
- 30 18. An envelope elimination and restoration linear amplifier comprising an envelope control loop including a feedback path, wherein the gain of said feedback path is variable for controlling the gain of the amplifier and said

feedback path includes downconverter means for downconverting the frequency of the feedback signal therein.

19. An amplifier according to claim 18, wherein said feedback path includes
5 gain control means before the downconverter means.

20. An amplifier according to claim 18, including a phase control loop.

21. An amplifier according to claim 20, wherein said feedback path includes
10 gain control means before the downconverter means.

22. An amplifier according to claim 18, wherein said feedback path is shared by the envelope control and phase control loops.

23. An amplifier according to claim 22, wherein said feedback path includes
15 gain control means before the downconverter means.

24. An amplifier according to claim 18, wherein the gain of the feedback path is electronically controllable.

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25. An amplifier according to claim 24, wherein the feedback path comprises variable gain means responsive to a control signal to set its gain.

26. A communications device including an RF power amplifier according to
25 claim 24.

27. A communications device including an RF power amplifier according to claim 25.

28. A communications device according to claim 26, including control means
30 for determining a desired output power and providing a corresponding control signal to the amplifier.

29. A communications device according to claim 27, including control means for determining a desired output power and providing a corresponding control signal to the amplifier.

5 30. A communications devices according to claim 26, including predistortion means for predistorting an input signal to compensate for signal distortion in the amplifier, the output of the predistortion means forming the input for the amplifier, wherein the predistortion applied by the predistortion means is independent of the gain of the amplifier.

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31. A communications devices according to claim 27, including predistortion means for predistorting an input signal to compensate for signal distortion in the amplifier, the output of the predistortion means forming the input for the amplifier, wherein the predistortion applied by the predistortion means is
15 independent of the gain of the amplifier.

32. An envelope elimination and restoration linear amplifier comprising an envelope control loop including a feedback path, wherein the gain of said feedback path is variable for controlling the gain of the amplifier, said feedback
20 path includes downconverter means for downconverting the frequency of the feedback signal therein and said feedback path includes gain control means before the downconverter means.

33. An amplifier according to claim 32, including a phase control loop.

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34. An amplifier according to claim 33, wherein said feedback path is shared by the envelope control and phase control loops.

35. An amplifier according to claim 32, wherein the gain of the feedback path
30 is electronically controllable.

36. An amplifier according to claim 35, wherein the feedback path comprises variable gain means responsive to a control signal to set its gain.

37. A communications device including an RF power amplifier according to claim 35.

5 38. A communications device including an RF power amplifier according to claim 36.

39. A communications device according to claim 37, including control means for determining a desired output power and providing a corresponding control
10 signal to the amplifier.

40. A communications device according to claim 38, including control means for determining a desired output power and providing a corresponding control signal to the amplifier.

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41. A communications devices according to claim 37, including predistortion means for predistorting an input signal to compensate for signal distortion in the amplifier, the output of the predistortion means forming the input for the amplifier, wherein the predistortion applied by the predistortion means is
20 independent of the gain of the amplifier.

42. A communications devices according to claim 38, including predistortion means for predistorting an input signal to compensate for signal distortion in the amplifier, the output of the predistortion means forming the input for the
25 amplifier, wherein the predistortion applied by the predistortion means is independent of the gain of the amplifier.

43. An envelope elimination and restoration linear amplifier comprising an envelope control loop including a feedback path and a phase control loop,
30 wherein the gain of said feedback path is variable for controlling the gain of the amplifier, said feedback path includes downconverter means for downconverting the frequency of the feedback signal therein, said feedback path includes gain

control means before the downconverter means and said feedback path is shared by the envelope control and phase control loops.

44. An amplifier according to claim 43, wherein the gain of the feedback path
5 is electronically controllable.

45. An amplifier according to claim 44, wherein the feedback path comprises variable gain means responsive to a control signal to set its gain.

10 46. A communications device including an RF power amplifier according to claim 44.

47. A communications device including an RF power amplifier according to claim 45.

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48. A communications device according to claim 44, including control means for determining a desired output power and providing a corresponding control signal to the amplifier.

20 49. A communications device according to claim 45, including control means for determining a desired output power and providing a corresponding control signal to the amplifier.

50. A communications devices according to claim 44, including predistortion
25 means for predistorting an input signal to compensate for signal distortion in the amplifier, the output of the predistortion means forming the input for the amplifier, wherein the predistortion applied by the predistortion means is independent of the gain of the amplifier.

30 51. A communications devices according to claim 45, including predistortion means for predistorting an input signal to compensate for signal distortion in the amplifier, the output of the predistortion means forming the input for the

amplifier, wherein the predistortion applied by the predistortion means is independent of the gain of the amplifier.